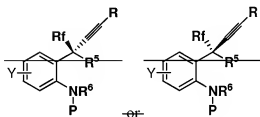


**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

**Claim 1 (Currently amended):** A process for synthesizing a the asymmetric synthesis of the chiral compound of the structure comprising the steps of



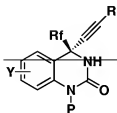
where Y is H, mono or multisubstituted electronwithdrawing group or electron-donating group, wherein Y can be located at *m*-, *o*-, or *p*-positon of the benzene ring;

P is hydogen or an amino protecting group;

Rf is fluoro-containing alkyl;

R is trialkylsilyl, alkyl, cycloalkyl or aryl group;

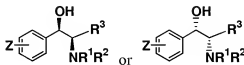
R<sup>6</sup> is hydrogen when R<sup>5</sup> is hydroxy, also R<sup>5</sup> and R<sup>6</sup> can be —HNCO— of the structure or its enantiomer



where Y, P, R, Rf is the same as above;

Comprising the steps of:

- (a) providing a mixture of mixing a chiral ligand (1R, 2R)-2-N, N- substituted-1-(substituted -phenyl)-2-R<sup>3</sup>-substituted-2-aminoethanol or its enantiomer having a formula of ~~the~~ of ~~the~~ of the structure



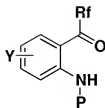
wherein R<sup>1</sup>, R<sup>2</sup> is an amino protecting group; [,] and R<sup>3</sup> is an alkyl[,:] alkyl- substituted with an alkoxy or silyoxy, carboxylic group, carbalkoxy group, hydroxyl methyl, cycloalkyl, aryl, or CH<sub>2</sub>OR<sup>4</sup>, wherein R<sup>4</sup> is being an oxygen protecting group[,]; Z is H, a mono- or multi- substituted electron-withdrawing group or electron-donating group, and ~~wherein Z can be~~ located at m-, o-, or p-positon of the benzene ring; with a terminal alkyne and a Zn(II), Cu(II) or Cu(I) salt ~~salt~~ in the presence of an organic base in an aprotic solvent,

wherein the terminal alkyne is

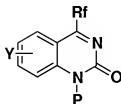


R is a trialkylsilyl, alkyl, cycloalkyl, or aryl group ~~the same as above~~,

- (b) mixing with the mixture with a of step (a) of reactant having a formula of the structure



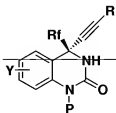
or of the structure



wherein P is hydrogen or an amino protecting group, Rf is a fluoro-containing alkyl, Y is H, a mono- or multi-substituted electron-withdrawing group or electron-donating group and located at *m*-, *o*-, or *p*-position of the ring the same as above;

isolating and obtaining a chiral compound ~~obtains the target addition product after~~  
~~normal isolation.~~

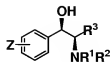
**Claim 2 (Currently amended):** The A process of claim 1, wherein the process is for the  
~~asymmetric synthesis of the chiral compound of the structure or its enantiomer~~



Comprising the steps of:

(a) providing a mixture of the chiral ligand (1R, 2R)-2-*N*, *N*- substituted-1-  
(substituted -phenyl)-2-*R*<sup>3</sup>-substituted-2-aminoethanol or its enantiomer is (1R, 2R)-2-

*N,N*-substitutedamino-1-(substituted-phenyl)-2-substituted-2-aminoethanol having a formula of , of the structure, or its enantiomer



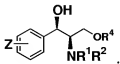
with a terminal alkyne and a Zn(II) or Cu salts in the presence of an organic base in aprotic solvent, wherein the terminal alkyne is



(b) —mixing with the mixture of step (a) of the reactant is of the structure

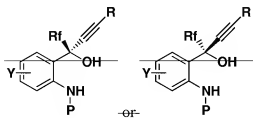


**Claim 3 (Currently amended):** The A process of claim 2, wherein the chiral ligand is (1R, 2R)-2-*N,N*-substitutedamino-1-(substituted-phenyl)-3-*O*-R<sup>4</sup>substituted-propane-1-ol or its enantiomer having a formula of , of the structure



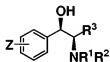
**Claim 4 (Currently amended):** The A process of claim 1, wherein ~~the process is for the~~

asymmetric synthesis of the chiral compound of the structure or its enantiomer



Comprising the steps of:

(a) providing a mixture of the chiral ligand is (1R, 2R)-2-*N,N*-substitutedamino-1-(substituted-phenyl)-2- $R^3$ -substituted-1-ethanol or its enantiomer having a formula of, of the structure,



with a terminal alkyne and a Zn(II)- or Cu salts in the presence of an organic base in aprotic solvent, wherein the terminal alkyne is



(b) mixing with the mixture of step (a) of and the reactant is of the structure



**Claim 5 (Currently amended):** The A process of claim 1, wherein  $R^1$  and  $R^2$  is an

alkyl, substituted alkyl, benzyl, trialkylsilyl, or substituted benzyl, the substituted group can be being a phenyl, naphenyl, halo, nitro, hydroxy, C<sub>1</sub>-C<sub>3</sub> hydroxyalkyl, C<sub>1</sub>-C<sub>4</sub> alkyl, or C<sub>1</sub>-C<sub>3</sub> alkoxy[;], or R<sup>1</sup>, R<sup>2</sup> being can be -(CH<sub>2</sub>)<sub>n</sub>X(CH<sub>2</sub>)<sub>m</sub>-, where X being can be CH<sub>2</sub>, O, or NH; n,m is an integer from 1 to 6[.];

P is hydrogen, an alkyl, substituted alkyl, benzyl, trialkylsilyl, or substituted benzyl, the substituted group can be being a phenyl, naphenyl, halo, nitro, hydroxy;

R<sup>4</sup> is an alkyl, substituted alkyl, benzyl, trialkylsilyl, or substituted benzyl, the substituted group can be being a phenyl, naphenyl, halo, nitro, hydroxy, C<sub>1</sub>-C<sub>3</sub> hydroxyalkyl, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> alkoxy or CN;

the electron-withdrawing group is a halogen, NO<sub>2</sub>, CF<sub>3</sub>, CH<sub>3</sub>SO<sub>2</sub>, CH<sub>3</sub>CH<sub>2</sub>SO<sub>2</sub>, PhCH<sub>2</sub>OCO, or AcO[.];

the electron-donating group is an alkoxy, OH, Me<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>O, Et<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>O, NH<sub>2</sub>, or C<sub>1</sub>-C<sub>4</sub> alkyl.

**Claim 6 (Currently amended):** The A process of claim 1, wherein R<sup>1</sup> and R<sup>2</sup> is a C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>1</sub>-C<sub>20</sub> substituted alkyl, trialkylsilyl, benzyl, or substituted benzyl, the substituted group can be being a phenyl, naphenyl, halo, nitro, hydroxy, C<sub>1</sub>-C<sub>3</sub> hydroxy alkyl, C<sub>1</sub>-C<sub>20</sub> alkyl, or C<sub>1</sub>-C<sub>3</sub> alkoxy[;], or R<sup>1</sup>, R<sup>2</sup> can be being -(CH<sub>2</sub>)<sub>n</sub>X(CH<sub>2</sub>)<sub>m</sub>-, where X can be being CH<sub>2</sub>, O or NH;

n,m is an integer from 1 to 6;

R<sup>3</sup> is a C<sub>1</sub>-C<sub>20</sub> alkyl[;], C<sub>1</sub>-C<sub>20</sub> alkyl substituted with an alkoxy or silyoxy, carboxylic group, C<sub>1</sub>-C<sub>20</sub> carbalkoxy group, hydroxyl methyl, C<sub>3</sub>-C<sub>20</sub> cycloalkyl, aryl, or

$\text{CH}_2\text{OR}^4$ , wherein  $\text{R}^4$  is being a  $\text{C}_1\text{-C}_{20}$  alkyl,  $\text{C}_1\text{-C}_{20}$  substituted alkyl, benzyl, or substituted benzyl, the substituted group ~~can be~~ being a phenyl, naphenyl, halo, nitro, hydroxy,  $\text{C}_1\text{-C}_3$  hydroxyalkyl,  $\text{C}_1\text{-C}_4$  alkyl,  $\text{C}_1\text{-C}_3$  alkoxy, or CN;

Z is H, F, Cl, Br, I,  $\text{CH}_3\text{SO}_2$ , OH,  $\text{PhCH}_2\text{O}$ , AcO, MeO, EtO,  $\text{Me}_2\text{NCH}_2\text{CH}_2\text{O}$ ,  $\text{Et}_2\text{NCH}_2\text{CH}_2\text{O}$ ,  $\text{PhCH}_2\text{OCO}$ , *t*-Bu, *i*-Pr,  $\text{NH}_2$ , or  $\text{NO}_2$ ;

P is hydrogen, a  $\text{C}_1\text{-C}_{20}$  alkyl,  $\text{C}_1\text{-C}_{20}$  substituted alkyl, benzyl, trialkylsilyl or substituted benzyl, the substituted group ~~can be~~ being a phenyl, naphenyl, halo, nitro, hydroxy,  $\text{C}_1\text{-C}_3$  hydroxyalkyl,  $\text{C}_1\text{-C}_4$  alkyl,  $\text{C}_1\text{-C}_3$  alkoxy, or CN;

Y is H, F, Cl, Br, I,  $\text{CH}_3\text{SO}_2$ , OH,  $\text{PhCH}_2\text{O}$ , AcO, MeO, EtO,  $\text{Me}_2\text{NCH}_2\text{CH}_2\text{O}$ ,  $\text{Et}_2\text{NCH}_2\text{CH}_2\text{O}$ ,  $\text{PhCH}_2\text{OCO}$ , *t*-Bu, *i*-Pr,  $\text{NH}_2$ , or  $\text{NO}_2$ ;

$\text{R}_f$  is a  $\text{C}_1\text{-C}_{20}$  fluoro-containing alkyl;

R is a trialkylsilyl,  $\text{C}_1\text{-C}_{20}$  alkyl[,],  $\text{C}_3\text{-C}_{20}$  cycloalkyl, or aryl group[.];

**Claim 7 (Currently amended):** The A process of claim 1, wherein  $\text{R}^1$  and  $\text{R}^2$  is a  $\text{C}_1\text{-C}_4$  alkyl, tri-phenylmethyl, *t*-butyldimethylsilyl, benzyl unsubstituted or substituted with  $\text{C}_1\text{-C}_4$  alkyl[,], *para*-methoxy benzyl[,], *para*-nitrobenzyl[,], *para*-chlorobenzyl[,], 2, 4-dichlorobenzyl[,], or 2, 4-dimethoxybenzyl[,], or  $\text{R}^1$ ,  $\text{R}^2$  ~~can be~~ being  $-(\text{CH}_2)_2\text{O}(\text{CH}_2)_2-$ ,  $-(\text{CH}_2)_2\text{N}(\text{CH}_2)_2-$ ,  $-(\text{CH}_2)_5-$ , or  $-(\text{CH}_2)_6-$ ;

$\text{R}^3$  is a  $\text{C}_1\text{-C}_4$  alkyl,  $\text{C}_1\text{-C}_4$  alkyl substituted with alkoxy or silyoxy, carboxylic group,  $\text{C}_1\text{-C}_4$  carbalkoxy group, hydroxyl methyl,  $\text{C}_3\text{-C}_6$  cycloalkyl, aryl or  $\text{CH}_2\text{OR}^4$ , wherein  $\text{R}^4$  being a is  $\text{C}_1\text{-C}_4$  alkyl, tri-phenyl methyl, *t*-butyl- dimethylsilyl, benzyl unsubstituted or substituted with  $\text{C}_1\text{-C}_4$  alkyl, *para*-methoxy benzyl, *para*-nitrobenzyl,

*para*-chlorobenzyl, 2, 4-dichlorobenzyl, 2, 4- dimethoxybenzyl, or trialkylsilyl groups;

Z is H, F, Cl, Br, I, CH<sub>3</sub>SO<sub>2</sub>, OH, PhCH<sub>2</sub>O, AcO, MeO, EtO, Me<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>O, Et<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>O, PhCH<sub>2</sub>OCO, *t*-Bu, *i*-Pr, NH<sub>2</sub>, or NO<sub>2</sub>;

P is hydrogen, a C<sub>1</sub>-C<sub>4</sub> alkyl, tri-phenylmethyl, *t*-butyldi- methylsilyl, benzyl unsubstituted or substituted with C<sub>1</sub>-C<sub>4</sub> alkyl; *para*-methoxy benzyl, *para*-nitrobenzyl, *para*-chlorobenzyl, 2,4-dichlorobenzyl, or 2, 4-dimethoxy- benzyl;

Y is H, Cl, Br, CH<sub>3</sub>SO<sub>2</sub>, CH<sub>3</sub>CH<sub>2</sub>SO<sub>2</sub>, NO<sub>2</sub>, or F;

R<sub>f</sub> is a C<sub>1</sub>-C<sub>4</sub> fluoro-containing alkyl;

R is a C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>6</sub> cycloalkyl, or aryl group, ~~wherein~~ aryl is being a phenyl, naphenyl, furan, thiophene, or pyrrole;

~~Halogen~~ halogen or halo is a fluoro, chloro, bromo, or and iodo.

**Claim 8 (Currently amended):** The A process of claim 1 ,wherein ~~the~~ stoichiometric ratios are about 0.1- 3 : 0.1-3 : 1-4 :1 of ligand : Zinc salt:the organic base : substrate ketone or ketimine.

**Claim 9 (Currently amended):** The A process of claim 1, wherein the Zine salt is selected from ZnCl<sub>2</sub>, ZnBr<sub>2</sub>, ZnF<sub>2</sub>, ZnI<sub>2</sub>, Zn(OTf)<sub>2</sub>, CuCl<sub>2</sub>, CuBr<sub>2</sub>, Cu(OTf)<sub>2</sub>, CuCl, CuBr, or Cu(OTf).

**Claim 10 (Currently amended):** The A process of claim 1, wherein the organic base is selected from MeN(*i*Pr)<sub>2</sub>, HNEt<sub>2</sub>, N(*i*Pr)<sub>3</sub>, pyridine, NEt<sub>3</sub>, piperidine, EtN(*i*Pr)<sub>2</sub>, or Bu<sub>3</sub>N.



**Claim 11 (Currently amended):** The A process of claim 1, wherein the reaction temperature is 0-100°C

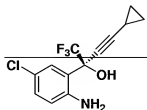
**Claim 12 (Currently amended):** The A process of claim 11 4, wherein the reaction temperature is 0-50°C.

**Claim 13 (Currently amended):** The A process of claim 1, wherein the aprotic reaction solvent is ~~selected from~~ THF, dioxane, Et<sub>2</sub>O, benzene, a mono or multi-alkylsubstituted-benzene, DME, toluene, n-hexane, CH<sub>2</sub>Cl<sub>2</sub> and a cyclohexane, or a mixture thereof. ~~One preferred solvent is toluene.~~

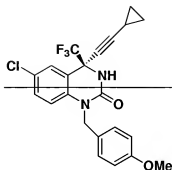
**Claim 14 (Currently amended):** The A process of claim 1, ~~wherein~~ further comprising the step of

quenching the mixture reaction by adding a proton source to give the chiral desired compound.

**Claim 15 (Currently amended):** The A process of claim 1, comprising the steps of wherein it is for the asymmetric synthesis of the chiral compound of the structure

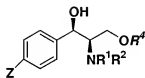


or of the structure



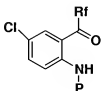
Comprising the steps of:

- (a) ~~providing a mixture of~~ mixing 0.1~3 molar equivalent of (1R,2R)-2-*N*-(substitutedamino)-1-(4-Z-substituted-phenyl)-3-*O*-*R*<sup>4</sup>-substituted propane-1-ol having a formula of [.] of the structure

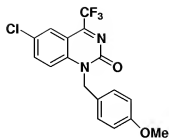


with 0.1~3 molar equivalent of cyclopropylacetylene<sub>1</sub> and 0.1~3 molar equivalent of Zn(II), Cu(I) or Cu(II) salts<sub>2</sub> and 1~4 molar equivalent of an organic base in organic solvent;

- (b) mixing with the mixture of step (a) with 1.0 molar equivalent of a reactant having a formula of of the structure



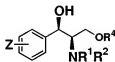
or of the structure



and maintaining the resulting reaction mixture at a temperature of between about 0-50°C for 1-20 hrs[.];

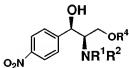
- (c) quenching by adding a proton source;
- (d) ~~to give the desired~~ obtaining the chiral compound.

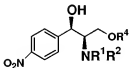
**Claim 16 (Currently amended):** ~~The A compound of the structure~~ or its enantiomer having a formula of



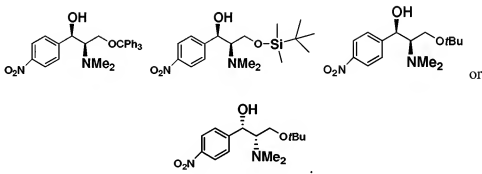
wherein R<sup>1</sup>, R<sup>2</sup> is an amino protecting group[.];  
 and R<sup>4</sup> is an oxygen protecting group;  
 Z is NO<sub>2</sub>, CH<sub>3</sub>SO<sub>2</sub>, or CH<sub>3</sub>CH<sub>2</sub>SO<sub>2</sub> ~~mono or multisubstituted electron-~~  
~~withdrawing group or electron-donating group;~~  
 and when Z is NO<sub>2</sub> at 4-postion of the phenyl, R<sup>1</sup> is N=O, R<sup>2</sup> is COCH<sub>3</sub>, R<sup>4</sup> is an  
 only alkyl, substituted alkyl, benzyl , substituted benzyl, or trialkylsilyl;  
 and when Z is NO<sub>2</sub> at 4-position of the phenyl, R<sup>1</sup>, R<sup>2</sup> is CH<sub>3</sub>, the ligand is only  
 (1R, 2R)-2-*N,N*-dimethylamino-1-(4- nitrophenyl )-3-*O*-R<sup>4</sup>-1-propanol[.];  
 and when Z is OCH<sub>3</sub> at 4 postion of the phenyl, R<sup>1</sup>, R<sup>2</sup> is CH<sub>3</sub>, R<sup>4</sup> is an only alkyl,

substituted alkyl, benzyl, substituted benzyl; said substituted group is phenyl, naphthyl, halogen,  $\text{NO}_2$ , hydroxyl,  $\text{C}_1\text{--C}_3$  hydroxyalkyl,  $\text{C}_1\text{--C}_4$  alkyl,  $\text{C}_1\text{--C}_3$  alkoxy, or  $\text{CN}$ ;

**Claim 17 (Currently amended):** The compound of claim 16 having a formula of  or the structure or its enantiomer



**Claim 18 (Currently amended):** The compound of claim 16, ~~of the structure~~ having a formula of or its enantiomer



**Claim 19 (Currently amended):** The compound of claim 16, wherein  $\text{R}^1$  and  $\text{R}^2$  is an alkyl, substituted alkyl, benzyl, trialkylsilyl, or substituted benzyl, the substituted group can be being a phenyl, naphenyl, halo, nitro, hydroxy,  $\text{C}_1\text{--C}_3$  hydroxyalkyl,  $\text{C}_1\text{--C}_4$  alkyl, or  $\text{C}_1\text{--C}_3$  alkoxy[;], or  $\text{R}^1$ ,  $\text{R}^2$  can be being  $-(\text{CH}_2)_n\text{X}(\text{CH}_2)_m-$ , where X can be being a  $\text{CH}_2$ ,  $\text{O}$ , or  $\text{NH}$ ;

$n, m$  is an integer from 1 to 6;

$R^4$  is an alkyl, substituted alkyl, benzyl, or substituted benzyl, the substituted group ~~can be~~ being a phenyl, naphenyl, halo, nitro, hydroxy,  $C_1\sim C_3$  hydroxy alkyl, alkyl,  $C_1\sim C_3$  alkoxy, or CN;

~~electron withdrawing group is halogen;  $Z$  is  $NO_2$ ,  $CF_3$ ,  $CH_3SO_2$ , or  $CH_3CH_2SO_2$ ;~~  
 $PhCH_2OCO_2$  or  $AeO_2$ ;

~~electron donating group is  $C_1\sim C_3$  alkoxy, OH,  $Me_2NCH_2CH_2O$ ,  $Et_2NCH_2CH_2O$ ,  $NH_2$ ,  $C_1\sim C_4$  alkyl;~~

and when  $Z$  is  $NO_2$  at 4-position of the phenyl,  $R^1$  is  $N=O$ ,  $R^2$  is  $COCH_3$ ,  $R^4$  is only alkyl, substituted alkyl, benzyl, substituted benzyl, or trialkylsilyl;

and when  $Z$  is  $NO_2$  at 4-position of the phenyl,  $R^1$ ,  $R^2$  is  $CH_3$ , the ligand is only (1R, 2R)-2-*N,N*-dimethyl-1-(4-nitrophenyl)-3-*O-R'*-1-propanol[;]

~~and when  $Z$  is  $OCH_3$  at 4 position of the phenyl,  $R^1$ ,  $R^2$  is  $CH_3$ ,  $R^4$  is only alkyl, substituted alkyl, benzyl, substituted benzyl.~~

**Claim 20 (Currently amended):** The compound of ~~according to~~ claim 16, wherein  $R^1$  and  $R^2$  is a  $C_1\sim C_{20}$  alkyl,  $C_1\sim C_{20}$  substituted alkyl, trialkylsilyl, benzyl, or substituted benzyl, the substituted group of alkyl or benzyl ~~can be~~ being a phenyl, naphenyl, halo, nitro, hydroxy,  $C_1\sim C_3$  hydroxyalkyl,  $C_1\sim C_4$  alkyl,  $C_1\sim C_3$  alkoxy, or  $CN[;]$ , or  $R^1$ ,  $R^2$  can be being  $-(CH_2)_mX(CH_2)_n$ , where  $X$  ~~can be~~ being  $CH_2$ , O or NH;

$n, m$  is an integer from 1 to 6;

$R^4$  is a  $C_1\sim C_{20}$  alkyl,  $C_1\sim C_{20}$  substituted alkyl, benzyl, trialkylsilyl, or substituted benzyl, the substituted group ~~can be~~ being a phenyl, naphenyl, halo, nitro, hydroxy,

C<sub>1</sub>~C<sub>3</sub> hydroxyalkyl, C<sub>1</sub>~C<sub>4</sub> alkyl, C<sub>1</sub>~C<sub>3</sub> alkoxy or CN;

Z is H, F, Cl, Br, I, CH<sub>3</sub>SO<sub>2</sub>, OH, PhCH<sub>2</sub>O, AcO, MeO, EtO, Me<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>O,  
 Et<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>O, PhCH<sub>2</sub>OCO, *t*-Bu, *i*-Pr, NH<sub>2</sub>, or NO<sub>2</sub>;

and when Z is NO<sub>2</sub> at 4-position of the phenyl, R<sup>1</sup> is N=O, R<sup>2</sup> is COCH<sub>3</sub>, R<sup>4</sup> is only  
an alkyl, substituted alkyl, benzyl, substituted benzyl, or trialkylsilyloxy;

and when Z is NO<sub>2</sub> at 4-position of the phenyl, R<sup>1</sup>, R<sup>2</sup> is CH<sub>3</sub>, the ligand is only  
 (1R, 2R)-2-*N,N*-dimethyl- amino-1-(4- nitrophenyl )-3-*O*-R<sup>4</sup>-propane-1-ol[;]

~~and when Z is OCH<sub>3</sub> at 4 position of the phenyl, R<sup>1</sup>, R<sup>2</sup> is CH<sub>3</sub>, R<sup>4</sup> is only alkyl,  
 substituted alkyl, benzyl, substituted benzyl; said substituted group is phenyl, naphthyl,  
 halogen, NO<sub>2</sub>, hydroxyl, C<sub>1</sub>~C<sub>3</sub> hydroxyalkyl, C<sub>1</sub>~C<sub>4</sub> alkyl, C<sub>1</sub>~C<sub>3</sub> alkoxy, or CN;~~

**Claim 21 (Currently amended):** The compound of ac according to claim 16, wherein R<sup>1</sup>  
 and R<sup>2</sup> is a C<sub>1</sub>~C<sub>4</sub> alkyl, tri-phenyl methyl, *t*-butyldimethylsilyl, benzyl unsubstituted or  
 substituted with C<sub>1</sub>-C<sub>4</sub> alkyl[;], *para*-methoxy benzyl[;], *para*-nitrobenzyl[;], *para*-  
 chlorobenzyl[;], 2, 4-dichlorobenzyl[;], 2, 4-dimethoxybenzyl;

R<sup>4</sup> is a C<sub>1</sub>~C<sub>4</sub> alkyl, tri-phenyl methyl, *t*-butyldimethylsilyl, benzyl unsubstituted  
 or substituted with C<sub>1</sub>~C<sub>4</sub> alkyl[;], *para*-methoxy benzyl[;], *para*-nitrobenzyl[;], *para*-  
 chlo- robenzyl[;], 2, 4-dichlorobenzyl[;], or 2, 4-dimethoxybenzyl;

Z is H, F, Cl, Br, I, CH<sub>3</sub>SO<sub>2</sub>, OH, PhCH<sub>2</sub>O, AcO, MeO, EtO, Me<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>O,  
 Et<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>O, PhCH<sub>2</sub>OCO, *t*-Bu, *i*-Pr, NH<sub>2</sub>, or NO<sub>2</sub>;

and when Z is NO<sub>2</sub> at 4-position of the phenyl, R<sup>1</sup> is N=O, R<sup>2</sup> is COCH<sub>3</sub>, R<sup>4</sup> is  
 only an alkyl, substituted alkyl, benzyl, substituted benzyl, or trialkylsilyl;

and when Z is NO<sub>2</sub> at 4-position of the phenyl, R<sup>1</sup>, R<sup>2</sup> is CH<sub>3</sub>, the ligand is only  
(1R, 2R)-2-*N,N*-dimethyl-amino-1-(4-nitrophenyl)-3-*O*-R<sup>f</sup>-propane-1-ol[;]

and when Z is OCH<sub>3</sub> at 4-position of the phenyl, R<sup>1</sup>, R<sup>2</sup> is CH<sub>3</sub>, R<sup>4</sup> is only alkyl,  
substituted alkyl, benzyl, substituted benzyl.